

**Abstract of the Disclosure**

The present invention provides a process sequence and related hardware for filling a hole with copper. The sequence comprises first forming a reliable barrier layer in the hole to prevent diffusion of the copper into the dielectric layer through which the hole is formed. One sequence  
5 comprises forming a generally conformal barrier layer over a patterned dielectric, etching the bottom of the hole, depositing a second barrier, and then filling the hole with copper. An alternative sequence comprises depositing a first barrier layer over a blanket dielectric layer, forming a hole through both the barrier layer and the dielectric layer, depositing a generally conformal second barrier layer in the hole, removing the barrier layer from the bottom of the hole, and selectively  
10 filling the hole with copper.